

Impacts and Determinants of Teamwork

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Abstract: This research's objectives are to propose a concept of teamwork linkage for the organizational effectiveness and to extract implications to build up teamwork competence supported by the concept. Many researches pay attention to specific teamwork like teamwork of people on the factory floor, or technical people like medical staffs and engineers when they make experimental research works on the determinants of teamwork. In this research main focus is put on various types of teamwork of the firm and their interactions to derive implications for teamwork effectiveness and build-ups. Under then New Economy, teamwork, internal and external, should be a key for success. The competence to design and implement effective teamwork will be critical for competitiveness.

Introduction

The effectiveness of teamwork has been widely recognized in real companies as well as in the research literature. Almost heroes of champion teams interviewed such as NFL, MBL, NBL after the champion games say, "This game was won by our excellent teamwork." Its effectiveness is not only known in the world of business. When it comes to the definition of teamwork, we follow the definition that "teamwork is a collaborative and shared activity that is directed towards a common goal", in other words, "organized co-operation". (Ingram and Desombre, 1999) Under the definition, we assume the activity is carried out to attain the goal or enhance the achievement level of the goal criteria as high as possible.

Benefits of teamwork are promotion of effective communication and collaboration, speeding actions, raising the commitment level, creating a more customer-focused culture and increasing organizational adaptability and flexibility, for example. (Drew and Thomas, 1997) The benefits, however, are not always guaranteed. There are companies successful in extracting the benefits. Also some others fail to do it. The authors point out 10 barriers. They include lack of sufficient senior management support and commitment, lack of clear vision, goals and objectives, insufficient release time from other duties for team members, failure to recognize and reward group efforts, inadequate training and skills development, and unwillingness to allow teams necessary autonomy and decision-making powers, etc.

The benefit, barrier and enabler (determinant) of teamwork have been advocated widely. Those barriers and enablers are factors to be considered in order to design effective teamwork in a specific situation like among workers on the floor or medical surgeons in the hospital. One approach to team is the normative one. (Marshack and Radner, 1972)

In our research we will provide a desirable structure of various teamwork types existing in the real firm, based on our experimental analysis. When we consider the effectiveness of the firm, we need to know there are many types of teamwork to achieve the firm's goals. It's not only the teamwork on the floor. Former Chairman of the Ford Motor Company, D.E.

Petersen mentioned six types (levels) of teamwork as follows: (Ciborra, 1993)

- between those who put the new technology in place and those who use it;
- among work groups at production level, across skills, functions, departments and classifications;
- between doers and managers, even at the expense of changing current industrial relations and divides;
- within the management group, downplaying or eliminating 'artificial' functional hierarchies so that managers can work together with the confidence of equals, obliterating the dominance of a function over others;
- among firms: in global industries firms need access to markets and technologies, to learn about new ways of organizing and to support large investment in R&D projects, and they can only do so by integrating competition and rivalry with co-operation and collaboration;
- across institutions, for example between business, academia, and government, to tackle problems such as workforce education or R&D that may concern the entire productive sector or the economy as a whole.

If the firm assumes division of labors and consists of many types of works and people, the concept of team is very comprehensive in the sense that the firm is itself a team as well as a web of teams. We have to deal with a team, at the same time, a system of teams. Traditional argument is mostly concerned with the former under the theme of teamwork. Mr. Petersen emphasized the latter as a challenging issue of the management. The reason of our focus is not to escape from the former, but to have another view to design teamwork, in addition to the concern about the contribution of teamwork to the firm as a whole. We hypothesize managing a web of teamwork is a strategic matter and the viewpoint from the firm as a web of teamwork gives us implications to design teamwork.

Hypotheses on Teamwork

Many authors take a team as a self-managing or empowered group. (For example, Goodman *et al.*, 1988) The underlying factor is empowerment. Then the first hypothesis is, to confirm it, a more strengthened team is characterized by high discretion of decision-makings.

The second hypothesis is as pointed out above, the competence of team members should be equipped with appropriate competence level of the team members. Even though they are committed and motivated, if they lack required knowledge and skills in their team missions, their performances will be lower. Then a more effective team is supported by the competence of its members. The team formation policy based on competence is promoted. This hypothesis is also to confirm the general argument.

The third hypothesis is the effect of rewards or incentives on the teamwork. More rewarding on teamwork competence, more activated the teamwork. The incentive system for the teamwork has been emphasized to implement effective teamwork.

With respect to the types of teamwork, we select those of internal teamwork of the

organization. That is, the types we pick up are five types. The first type is the teamwork on the floor, that is, among workers on the floor (TWFL). This is the basic teamwork for the firm. The second teamwork is among managers of different departments (TWMG). It determines the flow performance of jobs and works beyond departments. Managers do not belong to an institutionally independent team. Each of them is responsible for his or her department's performance. This type indicates a hidden team spirit. The third type is among functionally different managers and people (TWIF). We can say this as inter-functional teamwork. This is also an implicit teamwork between people in different functions. The fourth teamwork is between people on the floor and people in charge of the operations policy (TWFP). This type represents the teamwork in terms of consciousness of the factory direction. The fifth teamwork is between people in charge of the factory management and those in charge of the business strategy (TWST). Divergence of the business strategy and the operations policy indicates poor teamwork between them.

When we consider those types of the teamwork, we can not estimate which is more important since they look all important. Our fourth hypothesis is high performers show higher level of teamwork in all those teamwork types because, if the firm is good at handling 'teamwork', its competence will be applied to all types of teamwork. We assume here that general management principles applicable to 'teamwork' exist.

Results

Our data include 164 plants of five countries, Germany (33), Italy (34), Japan (46), UK (20) and USA (30). Data were collected from 1992-1997. Industries are Electronics, Machinery and Vehicle (Automobile). Twenty-six people including factory manager to direct workers answer to our questionnaires. Workers including leaders occupies more than half.

Table 1 summarizes correlation coefficients associated with hypotheses 1 to 3. All hypotheses are supported. Some implications are the incentive system and the competence criteria for promoting teamwork are effective, especially, operations-related teamwork, that is, the teamwork on the floor, the inter-departmental teamwork and the factory policy-related teamwork. The inter-functional teamwork and the business-strategy-related teamwork are influenced equally but less by the factors. Another cluster analysis suggests the firm's teamwork can be classified into two types, that is, the operations-related teamwork and the business-strategy-related teamwork. The former includes those three teamwork types and the latter two teamwork types as above. The three often cited factors seem to work on the operations-related teamwork. Table 2 exhibits the contents of teamwork' and factors' scales.

In order to test the fourth hypothesis, we have averaged the five teamwork levels and classified into three classes, that is, highest, middle and lowest group based on the average value of the five teamwork levels. Table 3 summarizes values of the five teamwork levels in the three groups as well as certain competitive measures' normalized values over the industries. The highest group shows higher value in every teamwork type and higher

performances in most of the competitive measures. Our hypothesis is confirmed.

Table 4 suggests a pattern to improve performances. The middle group improves the on-time delivery and quality by strengthening the operations-related teamwork. But in order to keep up with the highest group, the group enhances teamwork over all. The impact emerges in the time competencies, that is, the total cycle time and the speed of new product introduction. The competitive measures are more required nowadays.

Concluding Remarks

Teamwork is more and more required in the New Economy. It means how to extract potential effectiveness out of the division of labors. The division of labors is more unavoidable if more technical depth is required to seek for higher expertise in every area. Just an excellent teamwork on the floor is not enough anymore. But it does not mean the effectiveness of it declines in absolute terms. The other types of teamwork should be built up based on the competence of the teamwork. The highest group indicates it. The group does not ignore the competence.

As Mr. Petersen argued, the firm contains various types of teamwork to promote diversified businesses and develop new business models in the cyber world. The firm should establish a linkage structure of required teamwork. In this paper we have extracted the two broad types of teamwork, the operations-related teamwork and the business strategy-related teamwork. The former is indispensable to achieve excellency in operations. The latter should be strengthened to develop and implement strategy advantageously with speed. We need further research in this teamwork type. The factors mentioned so far may not be enough to enhance the teamwork type. Supports from IT or virtual reality technologies may be one factor without doubt. But its potentialities and limitations are not well researched.

One hypothetical argument is the two types should be linked to strengthen each other. The highest group's overall superiority in all teamwork types suggests such direction as a result. We should inquire into the relationship between the broad types.

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	Centralization	Competence criteria	Incentives for teamwork
TWFL	-.305**	.552**	.652**
TWMG	-.243**	.564**	.588**
TWIF	-.267**	.324**	.199*
TWFP	-.478**	.461**	.603**
TWST	-.291**	.323**	.278**

Note) * indicates significant at 5% significance level and ** significant at 1% level.

Table 1 Three factors' effects on the types of teamwork

Scale
<p>TWFL (Teamwork on the floor)</p> <ul style="list-style-type: none"> - During problem solving sessions, we make an effort to get all team members' opinions and ideas before decision making. - Our plant forms teams to solve problems. - Problem solving teams have helped improve manufacturing processes at this plant. - Employee teams are encouraged to try to solve their problems as much as possible.
<p>TWMC (Departmental managers' teamwork)</p> <ul style="list-style-type: none"> - Generally speaking, everyone in the plant works well together. - Departments in the plant communicate frequently with each other. - Management works together well on all important decisions.
<p>TWIF (Inter-functional teamwork)</p> <ul style="list-style-type: none"> - The functions of our firm are well integrated. - The functions in our company work well together. - Marketing and Finance know a great deal about manufacturing.
<p>TWFP (Factory policy penetration)</p> <ul style="list-style-type: none"> - In our plant, goals, objectives and strategies are communicated to me. - Strategies and goals are communicated primarily to managers. - I know how we are planning to be competitive at this plant. - I understand the long-run competitive strategy of this plant.
<p>TWST (Manufacturing strategy-business strategy linkage)</p> <ul style="list-style-type: none"> - We have a manufacturing strategy which is actively pursued. - Our business strategy is translated into manufacturing terms. - Potential manufacturing investments are screened for consistency with our business strategy. - At our plant, manufacturing is kept in step with our business strategy - Manufacturing management is not aware of the business strategy.
<p>Centralization</p> <ul style="list-style-type: none"> - Even small matters have to be referred to someone higher up for a final answer. - Any decision I make has to have my boss's approval. - There can be little action taken here until a supervisor approves a decision.
<p>Competency Criteria for selection</p> <ul style="list-style-type: none"> - We use problem-solving attitude as a criterion in selection of employees. - We use work values and behavioral attitudes as a criterion in employee selection - We select employees who can provide ideas to improve the manufacturing process.
<p>Incentive system for teamwork</p>

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- Promotion implies team participation and experience within the firm.
- Ability to work with others is essential for plant employees to advance.
- Quality of team participation is a significant part of performance evaluation at this plant.
- We use attitude/desire to work in a team as a criterion in employee selection.
- We select employees who are able to work well in small groups.

Note) All scales are passable by Cronbach's Alpha of .65 and factor loading .50.

Table 2 Scale contents

	Highest group	Middle group	Lowest group
TWFL	.506	-.048***	-.991***
TWMC	.819	.094***	-.888***
TWIF	.667	.127***	-.747***
TWFP	.798	-.067***	-1.044***
TWST	.633	-.296***	-.971***
Total cycle time	.411	-.057***	-.377***
On-time delivery	.394	.029**	-.452***
Quality(defect/return ratio)	.163	.232	-.241**
Flexibility	.263	-.070*	-.217***
Speed of new product introduction (subjective)	.783	-.193***	-.611***

Note) *** means significant at 1% significant level, ** implies significant at 5% and * means significant at 10% if compared with the highest group. Total cycle time is the time from procurement to delivery to customers. Flexibility means the time length of production plan which can not be changed. Except speed of new product introduction, all are measured by objective values. The figures above are all normalized values over the three industries.

Table 4 Differences between the groups